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Using Space to Describe Space: American Sign Language and the Sapir-Whorf Hypothesis

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Abstract

My study sought to combine two topics that have recently generated much interest among anthropologists. One of these topics is American Sign Language, the other is linguistic relativity. Although both topics have been a part of the literature for some time, neither has been studied extensively until the recent past. Both present exciting new horizons for understanding culture, particularly language and culture.

The first of these two topics is the study of American Sign Language. The reason for its previous absence from the literature has to do with unfortunate prejudice which, for a long time, kept ASL from being recognized as a legitimate language. The second has to do with a specific case of the Sapir-Whorf Hypothesis. This famous anthropological idea postulates that one's language guides the pattern of one's thought. Although proposed decades ago, little work has been done to validate or contradict the hypothesis, and that work which has been done has been plagued with methodological troubles. However, many scholars have recently begun looking into the hypothesis in the specific domain of space and made some exciting discoveries.

Contrary to previous beliefs, not all languages use a relative system of describing space. Relative systems establish location relative to other objects,

generally the ego. Absolute systems, in contrast, use cardinal directions. While both exist in many languages, speakers often heavily prefer one over the other (Levinson 1996). Comparing relative and absolute systems and how they affect cognition, researchers have obtained results showing affects on both memory and thinking (Lucy 1997).

In particular, a cross cultural study of several languages revealed striking differences in thinking between languages using relative and absolute coordinate systems. Participants were shown objects or movements on one table, rotated 180 degrees, and then asked to pick the same object, movement, or arrangement. Speakers of relative languages chose based on left and right, speakers of absolute languages chose based on cardinal directions (Majid et al 2004).

With all of the work that has been done in these two areas, it seems that the next logical step would be to combine these two areas. The study of how language shapes cognition seems particularly well suited for combination with the study of ASL. After all, signed languages have the unique trait that they utilize space in order to describe space. One cannot help but ask how this is affecting how the signer might internalize his or her concept of spatial reality differently than his or her speaking counterpart.

I asked questions of six users of American Sign Language in order to ascertain whether their language describes location relatively or absolutely. These participants were recruited from a local Deaf club that I have been attending for

over a year. I then replicated the study done by Majid, et. al. (2004) with users of ASL to see if the pattern discovered in this study carries over to manual languages. I predicted that ASL uses relative descriptions, and that the results for phase II would be similar to those found with speakers of relative languages in Majid, et al. (2004). While these predictions for the most part were verified, the more interesting result was that ASL turned out to use a special case of relative descriptions that will need to be the topic of further investigation.

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Literature Review

Recently, two topics have generated much interest among scholars of anthropology and language. One of these topics is American Sign Language, the language used by members of the Deaf Culture, and the third most used language in the United States. The other is linguistic relativity, or the idea that our language shapes our conception of reality. Although both topics have been a part of the literature for some time, neither has been studied extensively until the recent past. Both present exciting new horizons for understanding culture, particularly language and how it relates to culture.

American Sign Language

The first of these two topics is the study of American Sign Language. The reason for its previous absence from the literature has to do with unfortunate prejudice which, for a long time, kept ASL from being recognized as a legitimate language. To any Deaf person or indeed any person who has ever been exposed to ASL, the idea that it is not a language seems ridiculous. ASL has its own grammar rules and arbitrary associations, just like any spoken language.

Nevertheless, ignorance allowed the idea that ASL is somehow more primitive than spoken language to persist for sometime.

This coincides with an unfortunate history of well meaning hearing professionals attempting to eradicate ASL and Deaf Culture in order for Deaf children to fit in better with “normal” speaking people. For most of the history of even trying to educate the Deaf, sign language has been a forbidden practice at Deaf schools, as it was believed to hinder their abilities at “language.” Some even went so far as to advocate the separate of Deaf men and women so that they would not marry and have children, or even sterilization, so as not to pass on the Deaf trait (Branson, 2002).

Thankfully, following the lead of Stokoe in the 1970s , many Deaf scholars and others studying the Deaf have done pioneering work to establish ASL as a legitimate language (Senghas and Monagan 2002). Obviously, this has both research and social consequences. On the purely intellectual level, a vast new area of possible study has been opened up. On the social level, the Deaf have achieved recognition of their valued cultural ideals.

As stated above, most studies of American Sign Language have legitimized the language. These studies often search for aspects of ASL that mirror aspects of spoken languages in some way. One aspect that has been important in

counteracting critics who claim that ASL is simply gesture is establishing a phonological basis for ASL. Phonology is what distinguishes human language from sounds that convey meaning, such as those made by some primates. Human languages allow for the combination of arbitrary sounds to make a plethora of words, instead of being limited by the finite number of words that our mouth and larynx are capable of producing.

ASL has often been viewed as mainly gestural and without this phonological basis. However, handshapes, which are often completely arbitrary, are analogous to phonemes in spoken language (Lane et al. 1996). Like phonemes, these handshapes, or *cheremes*, are ordered together in an arbitrary fashion to give meaning to them (Liddell 1989). Signs can combine different handshapes in a specific order in the same way a word combines different phonemes in a specific order. Just as in spoken languages, if these cheremes are done in the incorrect order, the meaning is completely changed. Further, ASL also uses location in space and movement to convey meaning (Liddell 1989). Thus one handshape or order of handshapes placed in a different location or moved through space differently can have completely different meanings. This is highly significant because this means that, unlike spoken language, ASL has multiple pieces of information grouped together simultaneously to give meaning

(Liddell 1989).

Some studies have begun to go beyond the level of legitimizing ASL to seeing how it functions linguistically. For example, Lucas et al. (2002) examined variation in the location of the sign for “to know.” This mirrors the numerous studies performed by linguistic anthropologists on variations in the pronunciations of words in spoken languages. Lucas et al. found similar results to those studies as well. The best determinant for the location of the sign was grammatical function. However, just as in spoken language, variation was also observed by social group. Women, older individuals, and signers from rural areas were found to use the “correct” location of the sign more often than other social groups, which is also true for spoken languages. However, African American signers were found to use the “correct” form more often, which is different than with spoken languages. Lucas et al. hypothesized that this was because African American signers were particularly conscious of appearing to sign “improperly.” African American signers have faced double discrimination in many ways, and because of segregation, actually developed a different dialect of ASL. Finally, signers that grew up in families with Deaf parents used the correct form more often. This group really has no counterpart among Hearing people. Thus we see that ASL has similar sociological consequences to spoken languages.

Another exciting development in the study of sign language involves Deaf children in Nicaragua. Children from all over the country were brought together at a school, and subsequently began to create a new language (Senghas and Coppola 2002). Although much of the interest in these children has been in watching a language being created, it has also revealed much about visual language. Spatial modulation, an aspect of ASL which involves changing the movement of a verb depending on the subject and/or the object, has also been observed in Nicaraguan Sign Language. Further, studies reveal that students who entered the program later were more likely to do this, and to assign meaning to others modulating their signs (Senghas and Coppola 2002). Interestingly, signers of artificially created manual languages, such as Signed Exact English, which is supposed to have grammar identical to English, have been observed to “revert” to this spatial modulation of verbs (Lane et al. 2002). This all seems to indicate that there are certain unique aspects to manual languages which are somewhat universal. In fact, Senghas and Coppola refer to spatial modulations as “typical” building blocks of sign languages.

Linguistic Relativity

The second topic has to do with a specific case of the Sapir-Whorf Hypothesis. This infamous anthropological idea postulates that one's language guides the pattern of one's thought. Although proposed decades ago, little work has been done to validate or contradict the hypothesis, and that work which has been done has been plagued with methodological troubles. However, many scholars have recently begun looking into the hypothesis in the specific domain of space and made some exciting discoveries.

Studying how language affects cognition is inherently difficult. For one, as language is often a defining characteristic of a culture, separating the two and thus isolating the source of differences in cognition is troublesome. Further, conducting a study without using language proves rather difficult as well.

The methodological quandaries of such early studies as Bloom (1981) and Carroll and Cassegrande (1958) illustrated these problems. Bloom attempted to prove that the lack of counterfactuals in Chinese translated into a lack of counterfactual reasoning (Bloom 1981, cited in Lucy 1996). His study was criticized for poor methodology and poor translation. In particular, Au attacked his study, describing his procedures as “quasi-experimental” (Lucy 1996).

Bloom's approach was behavior-centered. He noticed a particular behavior, difficulties with counterfactual reasoning, and then attempted to search for a structure that caused this in the Standard Chinese language. Bloom seemed to find what he sought in his studies. His American subjects “readily accepted the question as a purely 'theoretical' exercise to be responded to according to the assumptions of the world it creates rather than in terms of their own experiences in the actual world” (Bloom 1981). In contrast, his Chinese subjects answered on the basis of “their own experiences relevant to the matter at hand” (Bloom 1981). This study exemplified one of the common problems with linguistic relativity studies outlined above. The focus is on a way in which a non-Indo-European language is causing a deficiency in some way.

Carroll and Cassegrande (1958) also performed an early linguistic relativity study, and initially obtained favorable results. Their study examined differences in categorization between children who spoke English and speakers of Navajo. Carroll and Cassgrande hypothesized that because the Navajo language favored form, Navajo children would group based on form. Earlier studies had already indicated that English-speaking children group based on color. Their results indeed found that Navajo children grouped objects differently based on the language they spoke. One reason that the study seemed so promising was that the

children in the study were all from the same culture and group, thus differences that may have come from culture could be controlled. However, the study was contradicted by a similar study with upper-class Boston children which obtained the 'incorrect' results for English speakers (Lucy 1996).

Many critics of the Sapir-Whorf hypothesis see these studies as evidence of the demise of the theory. However, as stated above, testing linguistic relativity is an inherently difficult task. When testing it, it must be viewed not as controlling thought, but as subtly guiding it. As Sapir so eloquently argued, “The instrument makes possible the product, the product refines the instrument” (Sapir, 1949 cited in Lucy 1996).

However, recent work has yielded better results, seemingly as a result of more refined techniques. One type of linguistic relativity study, the domain centered approach, is generally troubling because it focuses on easily defined categories, such as color (Lucy 1997). However, the domain of space is a natural domain, not a semantic one like color or kinship (Levinson 1996). This makes space uniquely applicable to the Sapir-Whorf hypothesis. The Max Plank institute has been studying this extensively.

Language and Space

Languages have varying ways of describing the locations of objects in space. Descriptions can be relative, meaning that they depend on the position of the speaker; absolute, which do not depend upon the position of the speaker; or intrinsic, which describes an object in relation to the 'intrinsic' front, back, etc. of an object.

Contrary to previous beliefs, not all languages use a relative system of

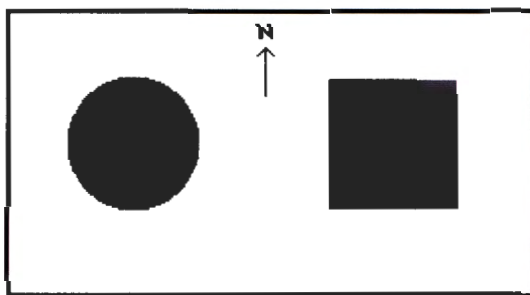


Figure 1: Relative or Absolute?

describing space. Relative systems establish location relative to other objects, generally the ego. For example, in figure 1, a relative description would state that the square is to the right of the circle. However, note that this is

dependent on the orientation of the person viewing the objects. Relative locations can also be described intrinsically. That is, where it is relative to the back, side, bottom, etc of an object. The back of the object is intrinsic to that object.

However, this can be misleading, because this will vary from one language to another. What one culture considers the “back” of an object is not necessarily the

same as what another language considers to be the back of that same object.

Absolute systems, in contrast, use cardinal directions. In the picture used in Figure 1, one would instead say that the box was to the east of the circle. While both types of descriptions exist in many languages, speakers often heavily prefer one over the other (Levinson 1996). For example, the English language obviously can express both relative or absolute relationships. However, the preference, especially for small distances, is definitely for relative descriptions. Many languages indeed do describe objects as absolutely “north” to another more frequently. Further some languages utilize only absolute directions. These languages do not use concepts like left and right to describe space. Such languages also have no symbolic association with their right and left hands (Levinson 1996.) This also means that they do not describe things intrinsically, such as stating things are to the “front” of an object.

Comparing relative and absolute systems and how they affect cognition, researchers have obtained results showing effects on both memory and thinking (Lucy 1997). In particular, a cross cultural study of several languages revealed striking differences in thinking between speakers of languages using relative and absolute coordinate systems (Majid, et al. 2004). Participants were first shown a card with two symbols on it, and then were turned around and asked to select the

identical card. The same procedure was repeated with the movement of an object through a maze with several possible outcomes and with several object on three separate tables. Speakers of relative languages chose based on left and right, speakers of absolute languages chose based on cardinal directions (Majid et al. 2004). Their actual conceptualization of the object or movement was different depending on how their language encodes spatial relationships. This supports the broader Sapir-Whorf hypothesis idea that language helps to shape cognitive patterns.

Combining the two Areas

With all of the work that has been done in these two areas, it seems that the next logical step would be to combine these two areas. The study of how language shapes cognition seems particularly well suited for combination with the study of ASL. After all, signed languages have the unique trait that they utilize space in order to describe space. As stated earlier, not just the handshape, but the location and the movement of a sign convey meaning in ASL. One cannot help but ask how this is affecting how the signer might internalize his or her concept of spatial reality differently than his or her speaking counterpart. In fact, his or her language

is even a part of his or her spatial reality, and in ASL the option of establishing reference points and in effect drawing in the air exists. The signer must also learn to interpret these references and spatial drawings from other signers as well.

Certainly there are signs for left right, north, south, east, and west in ASL. Interestingly enough, the signs for the cardinal directions are the handshape of the first letter of the English word combined with a movement in the direction's direction as if one was facing a map. Thus "north" is signed by making the n handshape and moving the hand up. Thus, interestingly, to two signers facing each other, north and south will be signed in the same direction, but east and west will not.

Thus, I sought to combine these two areas of thought into one study which could look at the way in which Deaf signers conceptualized space. In order to do this, I needed to document the way that ASL codes spatial ideas, and then examine how Deaf signers thought about space. My study builds on the work of Majid et al (2004) and extends it to the examination of signed as well as spoken languages.

Methodology

The goal of this research was two-fold. First, I sought to determine whether ASL described space using relative or absolute coordinates. In order to do this, I interviewed native signers of ASL, asking them several questions about the location of objects, both geographically distant and spatially nearby. This insured that differences in types of spatial relationships would be accounted for in the data.

Second, I replicated the study by Majid et al. (2004) on several spoken languages with native signers of ASL, to determine if they were thinking about space relatively or absolutely. This was accomplished by showing participants objects or movements on one table, and then rotating them 180 degrees and questioning them about the objects or movements. This was done with manipulatives, to minimize the use of the language itself in their answers and see how they were really thinking about the task.

Participants

Participants for this were recruited from the Cedarloo Association of the

Deaf in Waterloo, Iowa with permission from the chairperson. Members come to the meetings from around Waterloo and the neighboring city of Cedar Falls. The meetings are held in a large building that is also used for other purposes. I have personally been attending these meetings for almost two years in order to improve my ASL and to learn more about Deaf culture. Many of the members have become friends with me, and all are certainly used to my presence, which made recruitment easier.

All participants in phase I and phase II were Deaf, eighteen years of age or older, were deafened before the age of twelve and use American Sign Language, as opposed to other manual languages, such as Signed Exact English. For phase I, six participants were interviewed, and for phase II, nine were interviewed. All participants were given a consent form explaining their role in the research and asked to give consent both for participation in the study, and separately for the use of their videotaped images. Pictures of participants who consented to the study but who did not wish to have their image used do not appear in this paper. The membership of the club is primarily white, working class, and middle-aged.

After the formal part of the meetings, there is generally a social part of the meeting where members eat and chat with each other. At the end of one particular meeting, I made an announcement (in ASL) asking people to answer a few

questions during the social period of the meeting. Participants were then interviewed off to the side of the room.

Researcher's Personal Experience with ASL

I have been studying American Sign Language for two years and have achieved a level of proficiency, though at the time of the study was not yet fluent in the language. The assistance of an instructor of American Sign Language at the university, who is a native signer of ASL and is fluent in written English, was obtained for help in formulating questions and transcribing unknown words or phrases.

Phase I: The Spatial Language of ASL

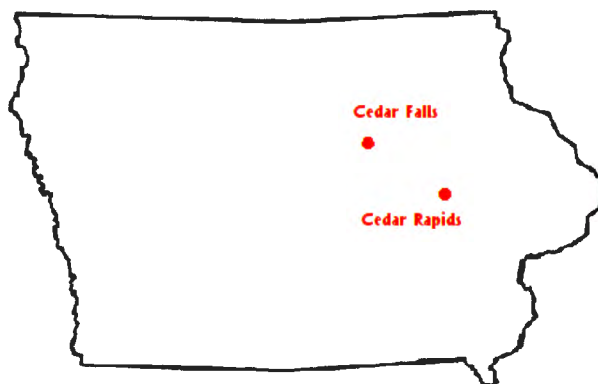


Figure 2: Map of Iowa

For the first phase of the study, six participants were asked to participate. The first phase of the study was designed to determine whether American Sign Language

uses relative or absolute descriptions of locations. All questions were asked in American Sign Language, and participants were specifically asked to sign their answers as if they were signing to another Deaf person. The responses were videotaped and later transcribed with the help of a native signer.

Participants were asked a series of four questions in American Sign Language about the location of specific places: Mexico, Cedar Rapids (a nearby city, see Figure 2), the pop machine, and the restroom. Their responses were videotaped and later transcribed. The locations asked about were designed to understand how they described locations of varying distances. Mexico is very far away; Cedar Rapids is fairly close. The pop machine and the restroom were both in the room that the interview took place in.

Participants were then asked to identify the location of several objects that were laid out on a table: a pencil, a ball, a book, a magazine, and a key (Figure 3). This was done in order to ascertain how they would describe objects on a small scale, and if their locations would vary based on the shape and type of object. The objects



Figure 3: Placement of Small Objects

were laid out on a table, and then I asked them to tell me the location of each object.

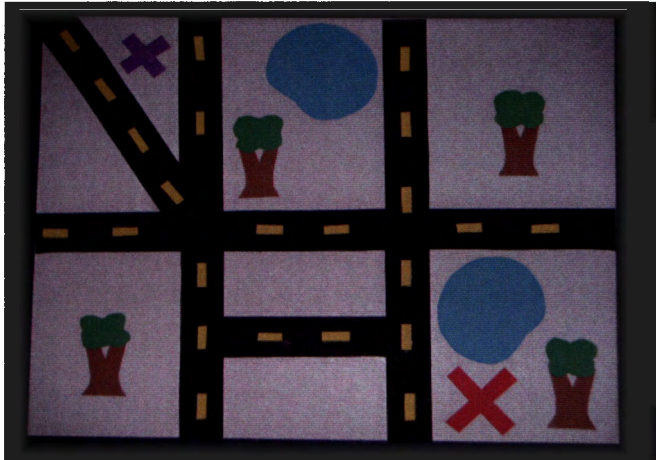


Figure 4: Giving Directions

Then a participant was given a large map which showed the location of his or her imaginary home and told to describe to another participant how to get there from his or her imaginary home (Figure 4). The second participant also had a map, but

it did not show the destination's location on it. The reason for the second participant was to insure that the description was not changed for a hearing audience. Deaf people have been observed to alter their signing when signing with hearing people. I felt that this was important to do for this question in particular because it was not as straightforward as the other questions.

Phase 2

The second phase required twelve participants, some of whom also participated in phase I. The second phase of the study was conducted at the same meeting as the first phase. In this phase, I attempted to replicate the study performed by Majid, et. al. in 2004 with Deaf participants. Participants were shown an object or a movement of an object on one table, rotated 180 degrees and then asked (in ASL) to pick the same object or movement on another table.

Specifically, participants were asked a series of four questions to determine the way in which their brain was encoding their spatial environment. These experiments were based on the experiments talked about by Majid et al. (2004). The first two of these tests were designed to determine whether their memory for spatial configuration was relative or absolute. The third and fourth tests were designed to determine if their memory for motion and path direction was relative or absolute.

Dot Test

First, participants were shown a card with a large and a small dot drawn on it. On

another table were four cards identical to this first card, but in four different orientations. After viewing the first card, participants were rotated 180 degrees so

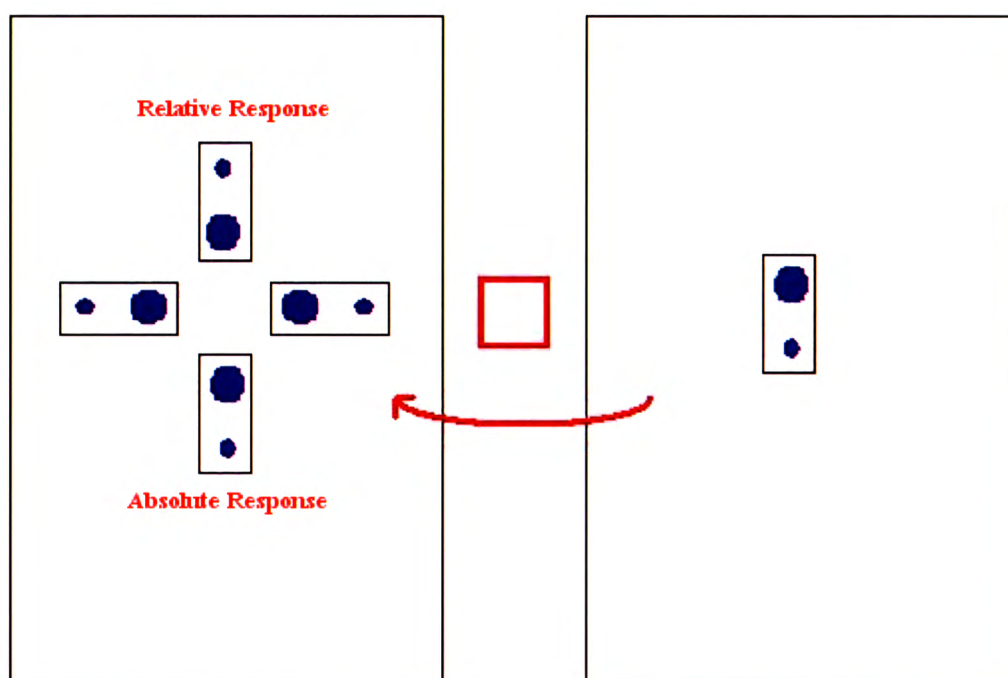


Figure 5: Dot Test

that they were now viewing the other table (See Figure 5). This was repeated six times with different orientations of the large dot: to the left of the small dot, to the right of the small dot, away from the participant, and towards the participant. Participants were then asked (in ASL) which card was the same as the card on the first table.

Shape Test

This procedure was repeated with two three dimensional objects for the second question. In this part of the test, instead of flat cards with dots on them, participants were shown three dimensional objects on one table, rotated and asked to placed one of these objects in relation to the other.

Maze Test

For the third test, participants utilized a maze with several possible solutions. On the first table, participants watched an object move in a particular pattern. Participants were then rotated like before, and then shown a maze, which had several solutions, one of which was the movement that they have been shown on the other table. They were then asked to move the object in the same manner that they had seen it moved on the first table through the maze (see figure 5). This was repeated five times with each participants, with the path being changed for each trial.

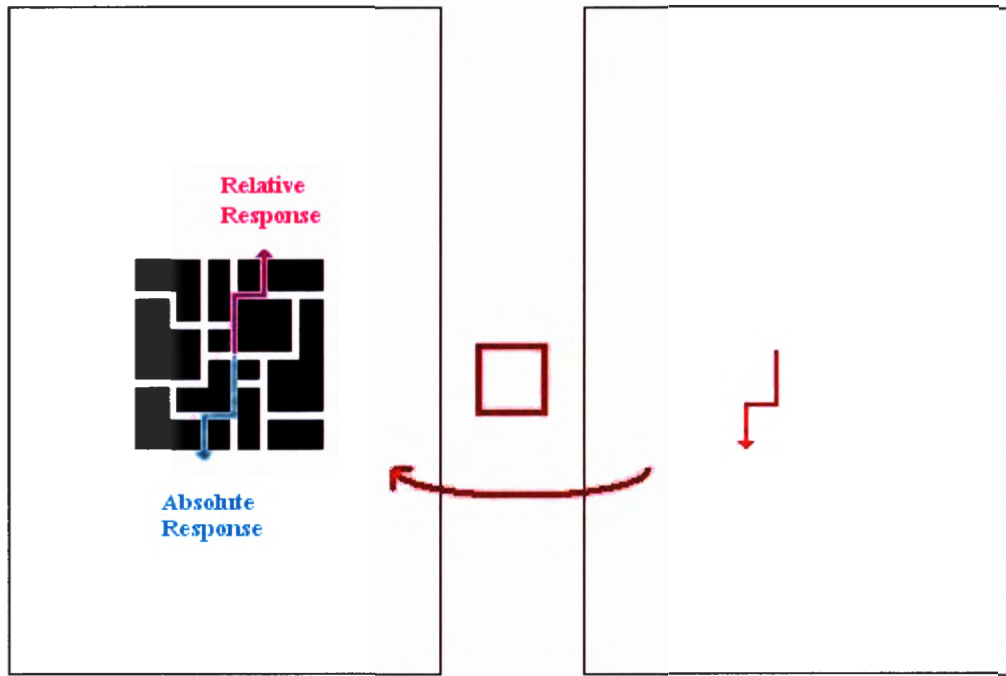


Figure 6: Maze Test

Spin Test

For the fourth test, participants were shown a circle which was spun. The participants were then rotated as before and asked to spin the circle in the same way that the first one had been done. This was repeated two times with the direction of the spin being altered with each trial.

After the data was gathered, each response for each trial was categorized as

relative, absolute, or untypable based on the methods of Majid, et. al. The data was then compared to the data obtained by Majid et. al. for the languages that they examined.

Results

Phase I

The first phase of the research involved three types of questions. The first two questions involved the locations of geographically far off locations. The second two involved the location of objects in the same room, and finally the last four involved the location of several small objects on a table. It is useful to examine each type of question individually to understand how and when users of ASL use relative, absolute, or other types of spatial descriptions.

Geographical Location Descriptions

The first two questions asked for the locations of Cedar Rapids, a nearby city, and the country Mexico. Even though English generally prefers relative

spatial language, far off places are the locations most likely to be described using absolute coordinates. One rarely, or perhaps even never, hears someone say that another state or city is “left” of here.

The case was similar for the Signers interviewed. These were the only questions for which respondents ever used the signs for south, north, east or west. However, the signs for these cardinal directions were often accompanied by other descriptive signs. For example, one participant did the sign for “south,” but then followed that by doing the sign for America, then holding a hand for America as reference and pointing under it with her other hand (Figure 7). About half of the participants added this sort of relative description to their answer of south for these questions.



Figure 7: Where is Mexico?

One participant was unfamiliar with the location of Cedar Rapids, and so she was asked to describe the location of Illinois. Here, she finger spelled Iowa,

held one hand in the air to hold as a reference, and then placed Illinois to the right of Iowa, from her perspective (Figure 8).



Places Iowa



Places Illinois while holding the reference point of Iowa

Figure 8: Where is Illinois?

Descriptions of Nearby Objects

The second two questions involved the locations of nearby objects or locations: the pop machine and the women's restroom. All respondents responded to both questions by pointing to the inquired after item, with over half of them adding non-manual signs to indicate the distance from their present location. Two of them added that the item was next to another item, such as the candy machine

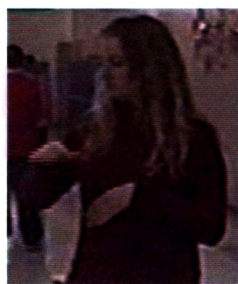
or the men's restroom, but did not orient the two items.

Locations of Small Objects

The last four questions asked about the location of small objects on a table. This is where English becomes very relative. When asked where the book or the pencil are located in relation with one and other, English speakers will use word such as right or left. However, this was not the case with ASL respondents. Out of all of them, only one ever used the signs for left or right, and still they were done in combination with other methods of description. Here is where the truly visual nature of ASL comes out. Instead of saying that objects are left or right or north or south of one and other, the respondents essentially drew pictures in the air showing the location of the objects in relation to one and other (see figure 9).



Sign for Book



Places the book in space



While holding hand where book is placed, does sign for orange



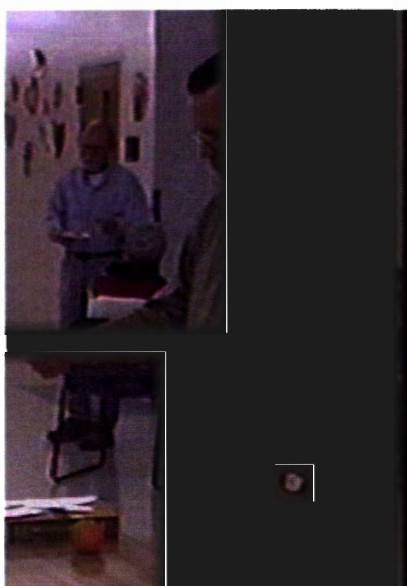
places hand next to hand representing book

Figure 9: Where is the Orange?

The example shown in figure nine was very typical of the responses given for this

phase. Because of the visual and three-dimensional nature of ASL, no descriptive words such as “left” are required for the signer to answer the question. Instead, the signer simply placed the objects in the sign space in front of them using the sign for the objects and their hands as references for the location of the objects.

Further, the signers were very descriptive about the layout of the objects. Consider the response about the location of the pencil (see figure 10).



Here the respondent is not just telling us where the pencil is located in space, but exact how it is oriented by orienting his finger in the same orientation of the actual pencil. This concisely tells the addressee a lot of information about the layout that in English would have required at least one sentence if not several.

Figure 10: Orienting the Pencil

Giving Directions

Finally, three participants were asked to give directions to another person using a map which showed a road and the location of two houses. Note in Figure

11 (on next page) how the signer draws the path needed through space. In last two frames she first points to the spot where her “house” is located, and then makes an x in space where she has just pointed. The path that she has drawn is exactly the same as the path on the map, but as if the map were actually in vertically front of her instead of on the table.



Figure 11: Giving Directions

Phase II

In phase two, the thinking of users of ASL was examined. Here the results were found to be overwhelming relative in all tests, especially the shape and circle test.

Table 1

	<i>Relative</i>	<i>Absolute</i>	<i>Untypable</i>
Dot Test	43 (79.6%)	4 (7.40 %)	7 (13.0 %)
Shape Test	50 (92.6 %)	4 (7.40 %)	0 (0.00 %)
Maze Test	46 (85.2 %)	0 (0.00 %)	8 (14.8 %)
Circle Test	27 (100 %)	0 (0.00 %)	0 (0.00 %)

The responses given by participants for the dot test were almost all (79.6%) classified as relative responses. Moreover, it is possible that some responses that were not relative may have been caused by a methodological problem. When

making the cards for the dot test, the two dots were printed off a computer, cut out, and taped onto index cards, and were assumed to be identical. However, during the data collection process, some of the respondents examined the cards closely and commented on the tape being placed in slightly different ways. However, all of them after a couple of trials understood that the goal was to select the card based on orientation, not on the tape. This, I believe, shows two things. For one, it shows the incredible attention to visual details that users of ASL seem to have. Second, it shows that despite the methodological error, once respondents figured out the goal of the exercise, all began to respond with relative answers.

For the shape test, a much larger percentage of responses (92.5 %) could be classified as relative. This may reflect the methodological problems which occurred with the dot test not being present for the shape test, and this may be a more true reflection of the thinking of the respondents.

Results from the maze test showed 86.2% of the responses as relative responses. Examining the “untypable” responses to the maze, we see some curious answers. Of the eight untypable maze answers, four of them, while not technically the “correct” relative answer, still seem to reflect a relative manner of

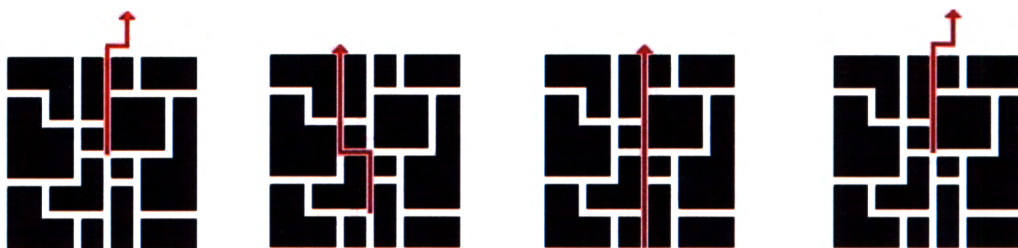


Figure 12 Untypable Responses

thinking. In the first a third mazes (see figure 11), the respondent physically picked up the object, placed it in a different location, and then moved it in the pattern shown. In the second and fourth, the respondent utilized space outside of the maze to give the answer. Review of the videotapes indicated that this was perhaps because the researcher moved the object in a somewhat longer and exaggerated path for these trials, another testament to the attention to visual detail of the Deaf participants.

For the circle test, an astonishing one-hundred percent of the responses were classified as relative. Part of this must certainly reflect the smaller amount of possible answers. Also, the test was simple, and thus perhaps ran into less confusion on the part of participants.

Discussion

Phase I

Although answering the question of whether ASL uses relative or absolute language to describe space at first seemed like a simple question, it proved difficult to answer. When it came to geographically far off places, absolute

answers were mixed with answers that utilized descriptive pictures and imaginary maps in front of the viewer. For a visual language, pointing to objects within the sight of those involved in the conversation, such as a nearby restroom or pop machine, seems perfectly logical. And, perhaps most difficult of all, how does one classify descriptions that use no “words” in the sense that hearing speaking people are familiar with the idea of a word? The signer does not describe the orange as either left or west of the book, rather it is visually shown in relationship to the other objects in the three dimensional picture the respondent draws. There is also incredible accuracy involved in the picture. The viewer is not just told that the book is closer to them than the pencil, but in fact even the actual orientation of the pencil. Here, the old adage that “a picture is worth a thousand words” rings true – simply, and eloquently, the signer tells others exactly where everything is, and the description is completely devoid of any spatial words such as left or north.

However, now consider what would occur if the signer rotated at a ninety degree angle. Because a signer's space is in front of him or her, he or she can no longer sign the description exactly as it is laid out. Anyone viewing is most likely facing the signer, and so the rotation will also make visual sense to him or her, but it is still no longer “absolutely” correct as it was before. Here the signer would draw the location of the objects as he or she remembered it in relationship to

where he or she was standing at the time, hence the description is relative.

Finally, consider the example of the woman giving directions based on the map placed in front of her. She did not draw the map horizontally as it was laid out on the table below her; she drew it as if the map were in fact hung vertically in front of her. We may speculate this may be because if she drew the path out in front of her, it would have been difficult for the other signer to see the correct path because it would have been drawn perpendicular to her viewpoint. Thus, we see that sometimes the signer can also alter the iconic representation for the benefit of the other person's understanding. The other signer easily understood the description and followed the directions correctly; suggesting that the shared space was established well and she understood what the signer was doing when she altered the plane she was mapping on.

Here it may be useful to consider the idea of iconic representations. Because it is a visual language with three dimensions to work with, ASL allows the user to represent space iconically. Charles Sanders Pierce tells us that iconic signs, in any language, are those signs which bear an actual physical resemblance to what they are representing (Hanks, 1996). In ASL the icon bears a resemblance to the actual location of the object, and often to its basic shape and orientation as well. For example the book was represented with a flat hand, the orange with a

more curved hand (Figure 9), and the pencil with a single finger (Figure 10), oriented in the direction the actual pencil was oriented. This iconic representation is possible only in visual languages, just as onomatopoeia are possible only in spoken languages.

Thus I propose that ASL, while relative, describes space in its own unique manner – the visual reality of the signer. ASL represents a special case of relative descriptions that I will refer to as “ego-centric relative,” meaning that the signer always draws a picture like that of his or her visual reality. If the signer is describing space within sight, such as the small objects on the table, the signer simply replicates exactly what he or she sees. In the case of what cannot possibly be “seen” by the signer, such as the United States and Mexico, the signer uses something that he or she can see to represent the items in question – an imaginary map in front of him or her. From the perspective of the signer, this is very relative. Even geographic descriptions are dependent upon his or her viewpoint.

The geographic representation requires a mental flip for the person viewing the signing. This is the case because an imaginary map makes absolutely no sense when viewed from behind. Even if one were to conceive of the map as a clear piece of vertical glass between the signer and the listener, which is the only way the listener would see the map, this would make no sense for the listener, because

there is no such visual reality with a map that way that they have ever seen.

Something else that would probably require a mental flip would be a description of something that the signer was remembering from before. To understand the iconic field of the signer, the viewer must recognize that the field is from the perspective of the signer.

Thus, I will refer to ASL as using “ego-centric relative,” meaning that everything in ASL is signed exactly as the signer sees it, whether he or she is seeing it in front of her, or utilizing an imaginary or remembered reference. The signer establishes a shared three dimensional graph with the other signer and this graph is used to iconically represent space as he or she understands it. Because the language is three dimensional, the placement of objects in the signer's drawing remains the same no matter the location of the signer, however the placement of the objects changes with respect to the signer's sign space.

According to Levinson's classifications, ASL fits within the realm of relative descriptions, as objects are indeed described relative to the signer from his or her perspective. However, ASL is a unique case of relative descriptions. It incorporates iconic elements that are not possible for spoken languages, allowing the signer to represent space without having to describe it. This even allows for the possibility of relativity in descriptions of geographically large descriptions

because a share iconic map can be drawn. ASL represents a truly unique system in this manner.

Phase II

As seen in the discussion, the results for phase II clearly showed a relative orientation. Given the methodological errors made, the fact that relative thinking still overrode these problems is even more striking. Although, of course, we must be hesitant to jump to conclusions about what the participants were thinking, this seems to go along with what was discussed earlier in phase I about signing space and movements as they remember them.

Now the question that we must answer is how this fits in with Majid, et al's 2004 findings. Although I argue that Sign Language is in fact not really relative nor absolute, because I believe it is based entirely on redrawing space from the signer's visual reality, the signer remembers objects in space from the perspective of his or her visual reality. This is backed up by our results from the phase II tests. The signers clearly remembered what they saw as it was shown or done from their perspective.

However, in comparison to results from Dutch speakers interviewed by

Majid et. al's 2004 results were not as relative. Almost one hundred percent of Dutch speakers responded relatively to the dot test and over ninety percent responded relatively to the maze test. The other two tests were not performed by Majid, et. al. However, part of this difference may have resulted from the methodological problems discussed earlier that occurred with the dot test and with the maze test. Note that the results were more relative for the other two tests, which supports this idea. Also observe that there were actually no absolute responses for the maze test, all of the answers which were not relative were untypable. For the dot test, almost twice as many untypable answers occur as absolute. This further supports my claim about methodological problems.

The results of phase II confirm the argument made earlier that signers describe and think about objects relative to their remembered viewpoint for the objects. Clearly, the signers thought about the objects in the way that they remembered them on the other table, independent of their actual absolute orientation. The results of the two phases together show that ASL is truly “ego-centric relative” in its descriptions and conceptualization of the world.

Conclusion

Perhaps the more interesting result of the research was not the original intention. Instead, we see the true complexity of the ASL system for describing space. Questions asked in this study barely scratched the surface of what we can discover about ASL and how it describes space in its own very unique manner. What we do see, though, is that we simply cannot regard visual languages in the same manner we regard spoken languages when it comes to this topic. ASL has the possibilities of three-dimensional iconic representations in space. Thus, to establish a shared reference does not require ambiguous words such as “left.”

This research opens up a plethora of possible future research ideas. For one, more questions concerning “remembered” locations must be asked to ascertain how these would be signed. Another interesting possibility would be to repeat the experiments done in phase II, but with a second participant. The researcher could show one signer the objects or movement, and then have them turn around and describe this to another signer, and see how they repeat the action. Repeating the same experiments with signers in other countries would add to this by showing whether or not this iconic method is a universal of signed languages. The importance is clear, as ASL allows us to separate speech and

language and possibly understand better the underlying thought and language of all humans, whether speaking or signing.

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